

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

- 1 1 (currently amended): A method of balancing a rotating machinery having
2 multiple non-coaxial shafts, each shaft having two correction planes, said the rotating machinery
3 having an inner frame, an outer casing, and counterweights connected with a shaft of said the
4 rotating machinery, said method comprising:
 - 5 mounting a proximity probe on said the outer casing, said the proximity probe
6 configured to provide phase readings to a phase reading output channel, wherein said the phase
7 reading is measured in degrees measured with respect to a key phasor;
 - 8 mounting a first plurality of velocity transducers on said the inner frame, each of
9 said the velocity transducers configured to provide a first plurality of velocity signals to a first
10 plurality of velocity signal output channels;
 - 11 mounting a second plurality of velocity transducers on said the outer casing, each
12 of said the velocity transducers configured to provide a second plurality of velocity signals to a
13 second plurality of velocity signal output channels;
 - 14 connecting said the phase reading output channel, said the first and second
15 plurality of velocity signal output channels to a data acquisition system;
 - 16 collecting vibration data for a number data channels, corresponding to
17 measurement planes, that are less than the number of correction planes, provided by said the
18 phase reading output channel, and said the first and second plurality of velocity signal channels,
19 using said the data acquisition system;
 - 20 removing said the outer casing to allow access to said the counterweights; and
21 adjusting said the counterweights using a predetermined rotor influence
22 coefficient to reduce said vibration below an acceptable threshold level.
- 1 2 (Currently Amended): The method of claim 1 wherein said the rotating
2 machinery is a three-shaft scroll pump.

1 3 (Currently Amended): The method of claim 1 wherein said the
2 proximity probe includes connecting said the proximity probe to said the outer casing.

1 4 (Currently Amended): The method of claim 1 wherein said the first plurality of
2 velocity transducers comprises at least two velocity transducers which are installed 90 degrees
3 from each other, in order to provide velocity data in two planes, and wherein one of said the at
4 least two velocity transducers is oriented in the direction of the key phasor.

1 5 (Currently Amended): The method of claim 1 wherein said the second plurality
2 of velocity transducers comprises at least two velocity transducers which are installed 90 degrees
3 from each other, in order to provide velocity data in two planes, and wherein one of said the at
4 least two velocity transducers is oriented in the direction of the key phasor.

1 6 (Currently Amended): The method of claim 1 wherein said collecting said
2 vibration data comprises collecting amplitude, velocity, and phase angle data, wherein said the
3 phase angle is measured in degrees from said key phasor.

1 7 (Currently Amended): The method of claim 1 wherein said collecting said
2 vibration data comprises collecting amplitude, velocity, and phase angle data, for start up, steady
3 state and coast down operating conditions, and wherein said the rotating machinery is operating
4 near a resonant condition during said steady state operating condition.

1 8 (Currently Amended): The method of claim 1 wherein said the shaft is one of
2 three shafts and wherein said counterweights comprise upper and a lower counterweights,
3 wherein each of said shafts is connected with an upper counterweight and a lower counterweight,
4 and wherein said upper and lower counterweights are mounted near the ends of each of said
5 shafts.

1 9 (Currently Amended): The method of claim 1 wherein said the
2 counterweights includes adding correction weights to and removing correction weights from said
3 the counterweights.

1 10 (Currently Amended): The method of claim 1 wherein said the
2 counterweights includes adding correction weights to and removing correction weights from said
3 the counterweights, and wherein said adjusting primarily comprises said removing when an
4 indicated vibration is in alignment with said counterweights, and wherein said adjusting
5 primarily comprises said adding when an indicated vibration is not alignment with said the
6 counterweights.

1 11 (Currently Amended): The method of claim 1 wherein said the predetermined
2 rotor influence coefficient is obtained from an equivalent rotating machinery, and wherein an
3 equivalent rotating machinery is a rotating machinery operating substantially at resonance.

1 12 (Currently Amended): The method of claim 1 wherein said the rotor influence
2 coefficient provides a measure for said adjusting said the counterweights, and wherein said the
3 measure is a weight adjustment per a vibration displacement and a weight placement angle value
4 measured with respect to the location of the maximum vibration displacement.

1 13 (Currently amended): A system for balancing a rotating machinery having
2 multiple shafts that are not coaxial and each shaft having two correction planes, said the rotating
3 machinery having an inner frame, an outer casing, and counterweights connected with a shaft of
4 said rotating machinery, said system comprising:

5 a proximity probe configured to be mounted on said the outer casing of said the
6 rotating machinery, said proximity probe configured to provide phase readings to a phase reading
7 output channel, wherein said phase reading is measured in degrees measured with respect to a
8 key phasor, located on one of said shafts;

9 a first plurality of velocity transducers configured to be mounted on said the inner
10 frame of said the rotating machinery, each of said velocity transducers configured to provide a
11 first plurality of velocity signals to a first plurality of velocity signal output channels;

12 a second plurality of velocity transducers configured to be mounted on said the
13 outer casing of said the rotating machinery, each of said velocity transducers configured to
14 provide a second plurality of velocity signals to a second plurality of velocity signal output
15 channels;

16 a data acquisition system for receiving said phase reading output channel, said
17 first and second plurality of velocity signal output channels, wherein the number of data channels
18 corresponding to measurement planes is less than the number of corrections planes; and

19 counterweights configured to be applied to said the shaft of said the rotating
20 machinery using a predetermined rotor influence coefficient.

1 14 (Currently amended): The system of claim 13 wherein said the rotating
2 machinery is a three-shaft scroll pump.

1 15 (original): The system of claim 13 wherein said first plurality of velocity
2 transducers comprises at least two velocity transducers which are installed 90 degrees from each
3 other, in order to provide velocity data in two planes, and wherein one of said at least two
4 velocity transducers is oriented in the direction of the key phasor.

1 16 (original): The system of claim 13 wherein said second plurality of velocity
2 transducers comprises at least two velocity transducers which are installed 90 degrees from each
3 other, in order to provide velocity data in two planes, and wherein one of said at least two
4 velocity transducers is oriented in the direction of the key phasor.

1 17 (currently amended): The system of claim 13 wherein said data acquisition
2 system ~~es~~ is configured to collect vibration data comprising amplitude, velocity, and phase angle
3 data, for start up, steady state and coast down operating conditions, and wherein said rotating
4 machinery is operating near a resonant condition during said the steady state operating condition.

1 18 (currently amended): The system of claim 13 wherein ~~said the~~ shaft is one of
2 three shafts and wherein said counterweights comprise upper and a lower counterweights,
3 wherein each of ~~said the~~ shafts is connected with an upper counterweight and a lower
4 counterweight, and wherein said upper and lower counterweights are mounted near the ends of
5 each of ~~said the~~ shafts.

1 19 (currently amended): The system of claim 13 wherein said counterweights
2 include correction weights to for adding and for removing correction weights from said
3 counterweights, and wherein said counterweights are removed when an indicated vibration is in
4 alignment with said counterweights, and wherein counterweights are added when an indicated
5 vibration is not alignment with said counterweights.

1 20 (currently amended): The system of claim 13 wherein ~~said the~~ predetermined
2 rotor influence coefficient is obtained from an equivalent rotating machinery, and wherein an
3 equivalent rotating machinery is a rotating machinery operating substantially at resonance.

1 21 (currently amended): The system of claim 13 wherein ~~said the~~ rotor influence
2 coefficient provides a measure for adjusting said counterweights, and wherein ~~said the~~ measure
3 is a weight adjustment per a vibration displacement and a weight placement angle value
4 measured with respect to the location of the maximum vibration displacement.